

Reptile-house¹; and that it should simultaneously turn up from several distinct localities is yet more remarkable. Described by Hubrecht, in 1879, from Sumatra, it was recorded two years later from Singapore by Blanford; and I find that the Python described in 1881 by Steindachner as *P. breitensteini*, from Borneo, of which a young specimen, noticed by the late J. G. Fischer, is now in the British Museum, is probably nothing but a synonym of *P. curtus*. It is true that Steindachner mentions seven pitted upper labials, whereas there are only two in *P. curtus*; but it is very probable that the author, in his MS., made use of the figure 2, which was taken for a 7 by the printer, and that the discrepancy is merely due to such an error. If, on re-examination, Steindachner's typical specimen should prove to have only the first two labials pitted, it may be safely held to be identical with *P. curtus*, the synonymy of which would then be as follows:—

1879. *Python curtus*, Hubrecht, Notes Leyden Mus. i. p. 244
(between Padang and Indrapura, Sumatra).
1881. *Python curtus*, Blanford, P. Z. S. 1881, p. 222 (Singapore).
1881. *Python breitensteini*, Steindachner, SB. Ak. Wien, lxxxii.
p. 267 (Teweh, Borneo).
1884. *Aspidoboa curta*, Sauvage, Bull. Soc. Philom. (7) viii. p. 143
(Sumatra).
1885. *Python breitensteini*, Fischer, Arch. f. Nat. li. p. 68, pl. v.
fig. 5 (N.E. Borneo).

The genus *Aspidoboa* was founded by Sauvage on the assumed absence of præmaxillary teeth; but as these teeth are present in the young specimen before me, I can see no reason, in spite of the somewhat aberrant physiognomy, for placing *Python curtus* in a separate genus.

4. On some Points in the Anatomy of the Female Organs of Generation of the Kangaroo, especially in relation to the acts of Impregnation and Parturition. By E. C. STIRLING, M.A., M.D. Cantab., F.R.C.S. Eng., Lecturer on Physiology in the University of Adelaide.

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Without claiming to be acquainted at first hand with much of the literature of the subject, I am aware that there has been much discussion concerning the sexual apparatus of the Macropodidæ. The present notes are a contribution to that part of the discussion that has centred round the questions whether or not an opening between the central median canal and the urogenital passages is of constant occurrence; and in the second place whether the embryo in the process of extrusion passes through the central canal or through one or other of the lateral passages.

¹ Presented by Mrs. Bonsor (see above, p. 393).

The literature bearing on these and other allied points has been concisely summarized by Messrs. Lister and Fletcher in the 'Proceedings' of this Society for 1881, p. 977. These authors also there record a condition of patency of the aforesaid opening in some species in which its existence had not been previously noted. I observe that while "no one as yet seems to have had the good fortune to find an embryo in any part of the vaginæ," Messrs. Lister and Fletcher nevertheless come to the following conclusion, which I quote:—"In the very early condition of the Macropodidæ the median canal is closed." Again they say:—

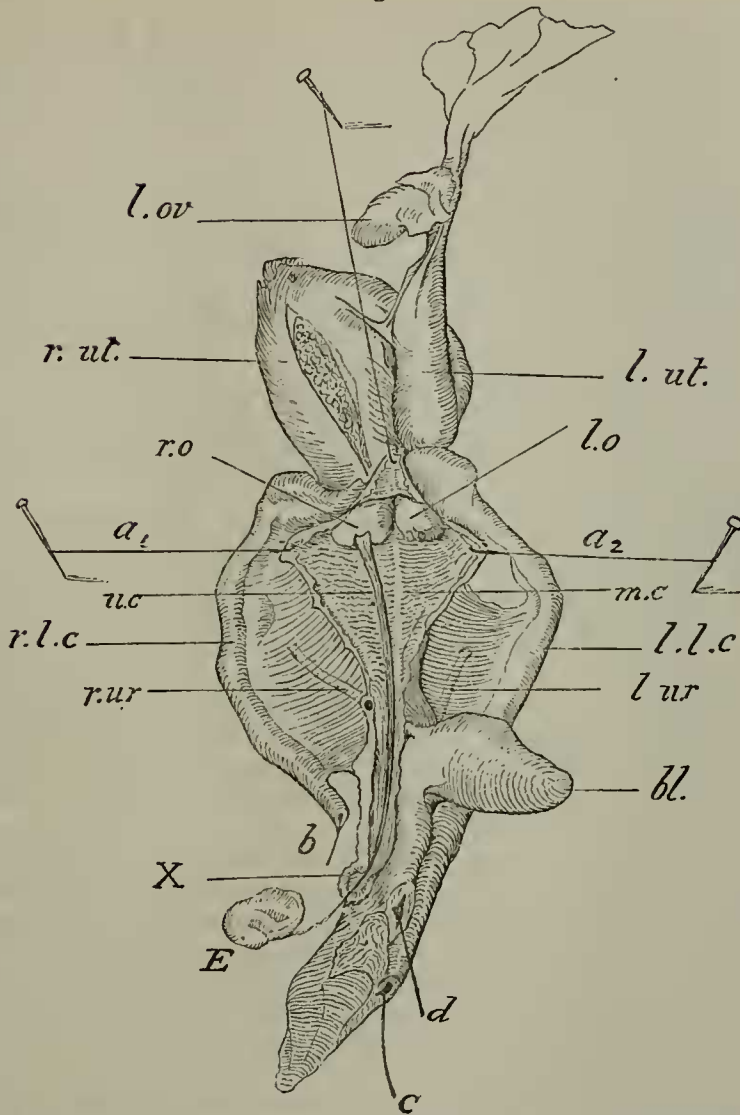
"In some genera, viz. *Macropus*, *Halmaturus*, *Petrogale* (*Dorcopsis* and *Dendrolagus*?), an opening is formed in the median canal to give passage to the young. This may take place in early life (*Halmaturus*), or not till young are about to be produced (*Macropus*). In the species *Macropus major*, however, this opening may or may not exist, and the young may be transmitted either through the median or the lateral canal."

For one species of Kangaroo, at least, this question of the route taken by the embryo may be considered settled, for I have been fortunate enough to obtain a specimen of the female organs of *Osphranter erubescens*, Sel., which contain the embryo in course of transit along the passages.

The organs in question, having been extracted by unskilled hands, were somewhat mutilated in the process, and further the operator, a cook in the camp of rabbiters, being a man of some intelligence and himself curious on the subject of marsupial parturition, had commenced an examination on his own account. These circumstances answer for the fact that the specimen is not anatomically complete, the lower part of the right lateral canal, a small part of the lower extremity of the left, and almost the whole of the urogenital passage having been cut away or left behind in the process of extraction. In the partial examination to which the specimen had been subjected before it came into my hands, the median canal had also been partially slit up from the front; and in view of existing incisions I found it convenient to continue the dissection from this side instead of from the posterior (dorsal) aspect, by which the parts can be more satisfactorily displayed. Fortunately the essential parts and their relations to one another had not been disturbed, and the following is a brief description of the specimen, represented in the accompanying drawing (fig. 1, p. 435) of about four fifths of the natural size.

The embryo, closely enveloped in a thin amnion, was 11, 6, and 5 mm. in the long, antero-posterior, and lateral diameters respectively; its anterior extremities distinctly five-partite, and the posterior distinctly three-partite and smaller than the anterior. The eyes just discernible as dark rings. It was suspended by a cord, which was extremely attenuated for some little distance from its point of attachment, though on unravelling this it was found to be distinctly membranous even at its thinnest part. The exact method of attachment of the cord to the body of the embryo cannot be stated with exactitude in this specimen, owing to the laceration which

Fig. 1.



Female organs of *Osphranter crubescens* ($\frac{1}{2}$ natural size). As explained in the text, nearly the whole of the urogenital passage has been cut away, but the drawing shows the median canal, *m.c.*, completely laid open along the ventral median line and the cut edges pulled apart by the threads a_1, a_2 .

Emerging from the right os uteri, *r.o.*, is the umbilical cord, *u.c.*, which is seen to pass along the median canal, *m.c.*, and to emerge from this by an opening, *X*. To the attenuated extremity of this cord is attached the embryo, *E*. Other references:—*r.ut.*, *l.ut.*, right and left uterus, the former considerably enlarged and partially laid open; *l.ov.*, left ovary; *bl.*, bladder; *r.l.c.*, *l.l.c.*, right and left lateral canals; *b, c*, bristles passed through their cut ends; *d*, bristle passing into urethra similarly cut across just before its termination in the urogenital passage; *r.o.*, *l.o.*, right and left os uteri; *r.ur.*, *l.ur.*, right and left ureters.

The openings from the lateral canals into the median are concealed from view, but were to be found just above the internal extremities of the lines *r.o.*, *l.o.*. Bulgings appear at the commencement of each lateral canal, crossed in the sketch by the same lines, *r.o.* and *l.o.*, but there was nothing inside to account for the swellings.

had taken place before the specimen came to hand, to which laceration, in fact, the above-mentioned attenuation of the cord was due; but there were distinct traces of a torn membrane similar to that constituting the cord attached to the edge of the umbilical aperture. A small coil of intestine protruded at the umbilicus, and no trace of allantois was visible external to the body.

Following the course of the cord to its attachment, it is seen to pass through a well-defined orifice of about 2-3 mm. in diameter, which opened into the median canal. The edges of this opening were longitudinally corrugated. In this median canal the cord became thicker, and was visibly composed of a semitranslucent tubular membrane much crumpled longitudinally; in its walls ran three considerable vessels. Indications of similar vessels could be traced back into the shrivelled and attenuated portion of the cord next to the embryo; but, owing to the small size of the part of the vascular system of the embryo they communicated with, they could be hardly distinguished.

This tubular cord continued through the median canal, which showed on the internal surface of its posterior (dorsal) wall a well-marked median raphe, rising in its lower part into a ridge of such prominence as to mark off two distinct channels; and proceeding from this median ridge were conspicuous transverse and oblique striæ, giving the surface a partly striated, partly reticulated appearance. The cord lay in the right hand of these divisions. The os of each uterus opened into the median canal through a prominent nipple-like projection only slightly larger than that on the left side, though the body of the organ on the right side was several times larger than its fellow. Traced through the os into the cavity of the right uterus the cord expanded into a thick and much plicated membrane, the folds of which dipped deeply down into corresponding sulci of the uterine lining. The two structures, however, were easily separable, there being apparently no vascular or other organic connection between them.

Not being able to satisfy myself as to the exact nature of the connection between the cord and the embryo in the above specimen, on account of its small size and partly torn condition, I referred to a larger specimen of an embryo, probably of *Macropus major*, which I happened to possess. From the absence of a record concerning it, I am unable to be positively sure either of the species to which it belonged or of the conditions under which it was found, but for various reasons I have little doubt but that it was a uterine embryo belonging to the aforesaid species. This was 25 mm. long, exclusive of tail, and closely enveloped in a transparent amnion which was reflected from the cord to about an inch which still remained attached.

The substance of the cord itself was formed of a close, tough membrane closely adherent to the edge of the umbilical aperture, and it concealed a small protruding loop of intestine. In its walls ran three vessels, the connections of which with the foetal vascular system I need not repeat here, as I found them to be exactly as described by Sir Richard Owen in his 'Anatomy of Vertebrates,' vol. iii. p. 719.

The allantois was represented by a shrivelled cord-like structure terminating in a blunt club-like extremity, lying alongside the other constituents of the cord and easily separable from them. This allantois was continuous with the fundus of the bladder, from which it extended 8 mm.

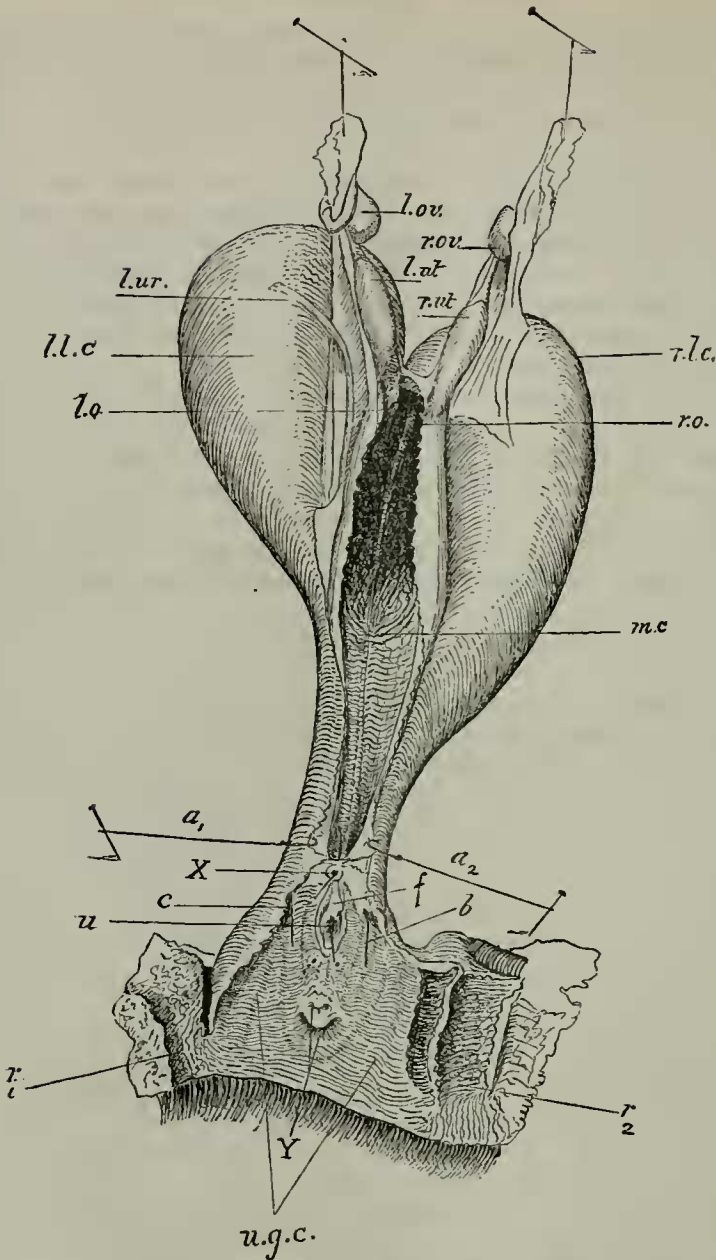
Along with the question of the route outwards of the embryo has been discussed also the route inwards of the seminal fluid, whether, in fact, this goes by the lateral canal or by the median canal when this is open. I am able to throw some light on this point (at least for *Macropus major*) by the receipt recently of a specimen of the female organs of an adult of this species shot immediately after an observed act of coitus.

In this specimen, which is represented in the drawing (fig. 2, p. 438) about one half of the natural size, the lateral canals were enormously distended by what proved to be six and a quarter ounces (by weight) of a viscid tenacious mucus-like substance containing abundant spermatozoa. The median canal was also distended to a size which would, in its upper part, more than contain two good-sized thumbs, and which contained some of the same kind of mucus-like material as that in the central canals, the mass in each being continuous. In its lower third the median canal narrowed down to a size that would scarcely admit a pencil.

The opening between the median and each lateral canal was very large and patent, admitting a large thumb easily. Both anterior (ventral) and posterior (dorsal) walls of the median canal were no thicker than stout parchment, and the internal surface of the former showed a distinct median raphe, which, as in the preceding specimen, rose into such a well-marked ridge in the lower part as to divide the passage into two similar well-marked channels. The same striated and reticulated appearance of its walls in the lower part also existed. Between the median canal and the urogenital passage there was a well-defined but small passage that would barely admit an ordinary steel knitting-needle. Seven mm. below this aperture, on the anterior (ventral) wall of the urogenital passage, was the orifice of the urethra (*u*, figs. 2 & 3); and between these two openings extended a laterally compressed keel-like projection (*vide* figs. 2 & 3, *f*), 5 mm. in height, thin at its free edge, springing from a base (6 mm. long and 3 mm. wide) from the posterior (dorsal) surface of the urethra. In fact the urethra might be described as piercing longitudinally the base of this projection. Both the urethral orifices and this keel-like ridge occupied a narrow ellipsoidal and depressed area marked off by a well-marked (*g*, fig. 3) ridge of corresponding outline.

Situated in the middle line, exactly midway between the orifice of the urethra and the joint outlet of the combined urogenital and rectal canals, was a flat tongue-like process (*Y*, fig. 2), compressed dorso-ventrally and pointing inferiorly towards the outlet of the passage. This covered up a cul-de-sac, which extended upwards under it for 5-6 mm., and with a similar width. On the posterior dorsal surface of this tongue-like flap was another smaller cul-de-sac, leading upwards also for about 3 mm., and with about the same

Fig. 2.

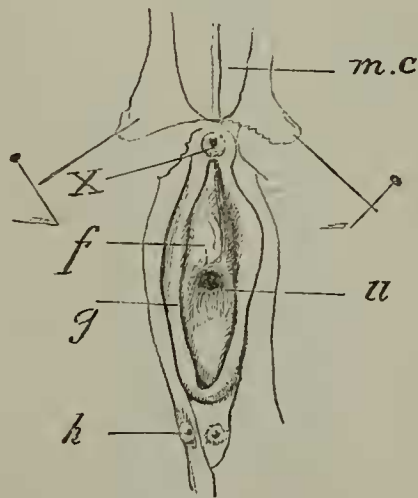
Female organs of *Macropus major* ($\frac{1}{2}$ natural size).

The organs have been laid open by a *dorsal* median incision. The two lateral canals, *l.l.c.*, *r.l.c.*, are seen enormously distended in their upper parts. The upper part of the median canal, *m.c.*, is also much distended. The large openings between this and the lateral canals are not seen; *l.o.* points to the os of the left uterus, *r.o.* to the right os; *r.ov.*, *l.ov.*, right and left ovaries. The threads, *a₁*, *a₂*, pull asunder the walls of the lower part of the median canal, in which can be seen the ridge spoken of in the text, *X*, opening between the median canal and the urogenital passage, *u.g.c.*; *u.*, orifice of urethra, into which a bristle is passed and just above this is the keel-like process, *f*, described in the text and represented on a larger scale in fig. 3; *Y*, points to the larger and smaller culs-de-sac described in the text; *r₁*, *r₂*, the two lateral halves of the rectum completely cut across longitudinally in laying open the median canal from behind; *b*, *c*, bristles passed into the openings of the right and left lateral canals into the urogenital passage.

width. No apertures of any kind could be detected opening into either of these culs-de-sac or any structure rudimentary, or otherwise, in connection with them. No trace of a bifid arrangement. Structures similar to this and the preceding I have neither met with nor seen described, and I leave their nature and relations for further description and investigation, this being foreign to my present purpose.

The conspicuous longitudinal ridges in the ventral wall of the urogenital canal described by Mr. Fletcher (Proceedings of the Linnean Society of New South Wales, vol. vi. 1881), whose description I have frequently been able to confirm, were not in this case very well marked; still, two ill-defined folds of mucous membrane were

Fig. 3.



Enlarged sketch of parts adjacent to urethral orifice of *Osphrante crubescens*, Sel.

m.c., median canal; *X*, opening between this and the urogenital passage; *u*, orifice of urethra; *f*, keel-like process extending between *u* and *X*; *g*, ridge marking off the ellipsoidal space in which *u* and *f* are situated; *h*, openings of ducts of Bartholin.

recognizable in the positions indicated by him; other ridges existed still less well marked and of irregular arrangement.

In the above description I have made no attempt to treat in any way exhaustively the subject of the anatomy and the homologies of the female generative organs, and there is much even in these two specimens which seems to require further examination and explanation. There seems also to exist a considerable amount of variation in the disposition and relations of the various parts even in closely allied species. I present these very important notes particularly with the view of throwing light upon the questions as to which passages are traversed by the seminal fluid and the embryo respectively. So

far as these points are concerned, it seems clear that in *Macropus major* the semen passes inwards by the lateral canals, even when the opening into the median canal exists, and in *Osphranter erubescens* that the embryo passes out by the median canal; but in view of the differences of structure and relations of the different parts that have been observed in different genera and species, it is not yet safe to say that these statements constitute a rule for the whole of the Macropodidæ.

5. Contributions to the Natural History of an Annelid of the Genus *Dero*. By FRANK E. BEDDARD, M.A., F.Z.S.

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I have had the opportunity lately of observing the sexual form of a species of *Dero*, which I identify with *D. perrieri*. A large number of these Annelids made their appearance in some water containing *Chara* which I received from Messrs. Bolton of Birmingham; at the end of August all, or nearly all, were sexually mature. As there appears to be no account of the reproductive organs of this worm extant, I think it worth while to publish the present notes. Except as regards the sexual organs, they are for the most part confirmatory of Perrier.

The worms reached a length of about half an inch; they were extremely active in their habits, wriggling about very much after the fashion of a free-living Nematode; the colour appeared to the naked eye of a dark violet posteriorly; in front the development of the clitellum and of the sexual products produced an opaque yellowish-white appearance. The eggs could be distinctly seen and counted with an ordinary hand-lens; they lie behind the clitellum; I observed the number to be almost constantly three. I have made no observations upon the tube, which, according to Perrier ("Histoire naturelle du *Dero obtusa*," Arch. Zool. exp. t. i. (1872) p. 65) and Bousfield ("The Natural History of the Genus *Dero*," Journ. Linn. Soc. vol. xx. (1887) p. 91) are fabricated by the worms. The fact that they make for themselves an habitation of this kind distinguishes the genus *Dero* from *Nais*, to which all recent writers concur in regarding *Dero* as closely related.

The new facts which are brought forward in the present communication strongly support that view of the affinities of the worm, which may indeed now be regarded as fully established.

The general anatomy of the worm has been described chiefly by d'Udekem ("Nouvelle Classification des Annélides sétigères abranches," Bull. Acad. Roy. Belge, t. xxii. pt. 2, p. 549 *et seq.*), Perrier (*loc. cit.*), and Bousfield (*loc. cit.*). Stolč (" *Dero digitata*," O. F. Müller, Anatomická a histologická studie," SB. böhm. Gesells. 1885, p. 65), in a paper overlooked by Bousfield and omitted from an otherwise tolerably complete list of papers dealing with *Dero*, has contributed details of importance, being apparently the first to have made use of the section method. I refrain from attempting